June 26, 1934. E. B. FAIRCHILD 1,964,317

ELECTRIC SIGNALING DEVICE

Filed Oct. 12, 1931 2 Sheets-Sheet 1

Fig. 1.

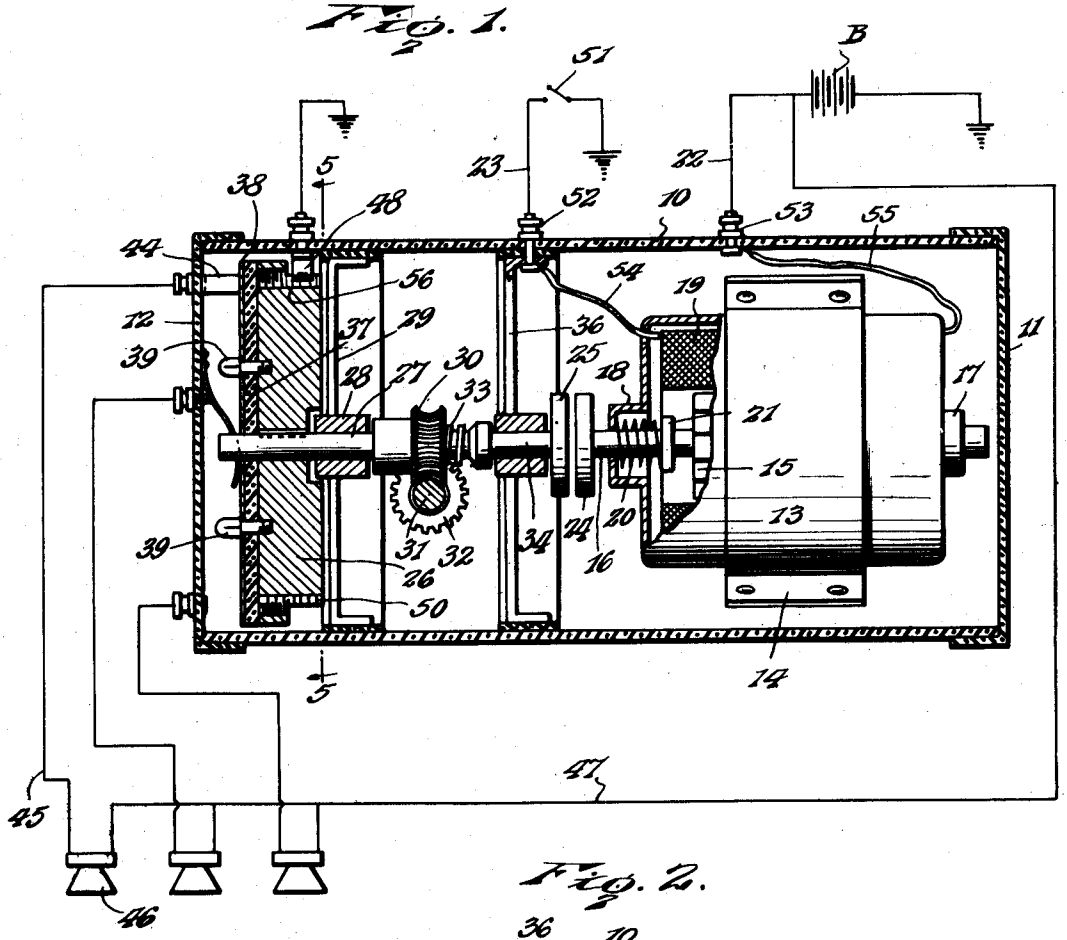
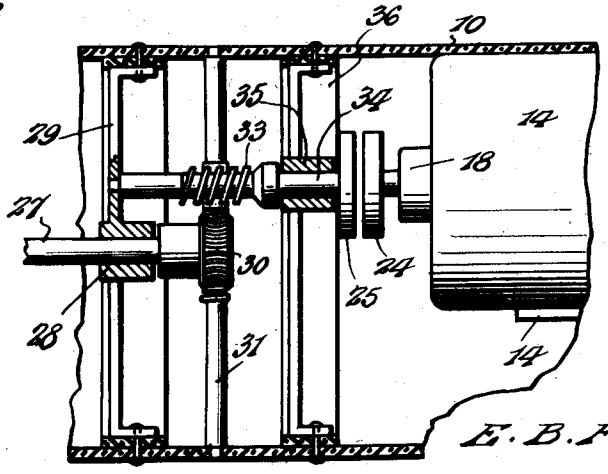


Fig. 2.



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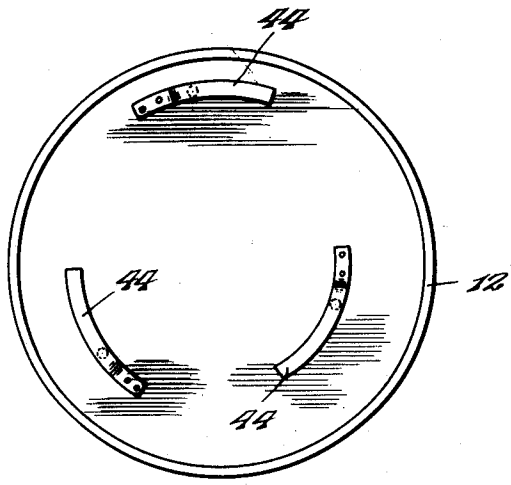


Fig. 3.

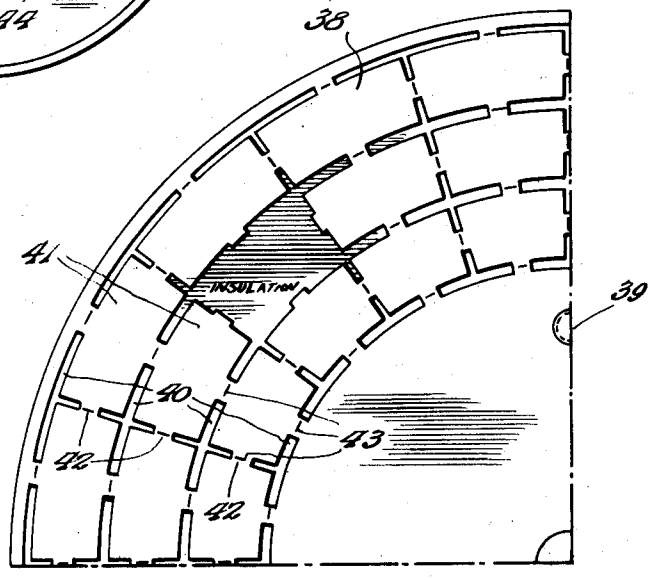
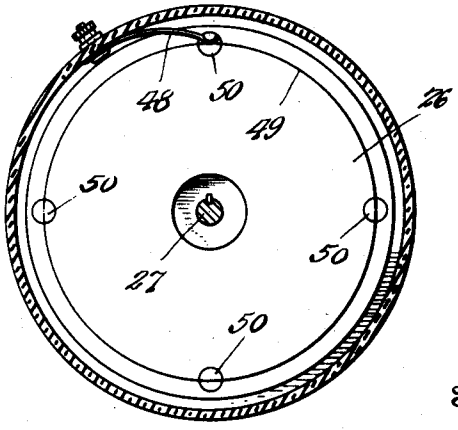


Fig. 4.

Fig. 5.



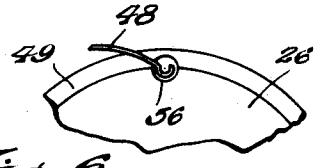


Fig. 6.

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UNITED STATES PATENT OFFICE

1,964,317

ELECTRIC SIGNALING DEVICE

Edwin Bradley Fairchild, Manila, Philippine Islands

Application October 12, 1931, Serial No. 568,450

6 Claims. (Cl. 200—11)

This invention relates to electric signaling devices and has for an object to provide a device of this character which will produce a predetermined sequence of blasts and rests, the duration of which may be arranged according to the fancy and choice of the individual owner.

A further object is to provide a motor-rotated disk on which are an annular series of contacts passing under corresponding brushes connected to corresponding signals, the contacts on the disk being capable of being arranged in a predetermined manner at the will of the individual so as to allow current to flow automatically in a corresponding series of intervals to one or more of the connected signals as the disk is made to rotate under the brushes by the motor.

A still further object is to provide in a signal of this character a motor-rotated disk which is faced with a frangible brittle metal disk perforated to produce concentric annular series of contact segments, any number of which may be torn out by the operator to produce a predetermined pattern for providing a desired sequence of closing an electric circuit to energize the electrical signal device, such as a horn, bell, lamp or other like device.

A still further object is to provide the motor-rotated disk with screws at intervals in the circumference disposed parallel to the axis of the disk and electrically connected in circuit with said brittle metal disk to break the circuit independent of the latter, removal of one or more of the screws permitting a corresponding break in the circuit to stop the apparatus one or more times during each complete revolution of the motor-rotated disk.

A still further object is to provide an extremely simple, small and compact device of this character which will be formed of a few strong, durable and rugged parts which are inexpensive to manufacture and which will not easily get out of order.

With the above and other objects in view the invention consists in certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming part of this specification,

Figure 1 is a longitudinal sectional view through an automatic signal device constructed in accordance with my invention and showing signal horns diagrammatically for the purpose of illustration,

Fig. 2 is a detail sectional view showing the reduction gearing and shafts operatively connecting the motor with the make-and-break disk,

Fig. 3 is a rear view of the end cap showing the arrangement of the brushes thereon for engaging the contacts of the make-and-break disk,

Fig. 4 is a fragmentary front elevation of the make-and-break disk showing the frangible brittle metal tracks for the brushes, perforated to permit easy tearing off of any predetermined number of the perforated blanks to vary the sequence and duration of the signals,

Fig. 5 is a cross sectional view taken on the line 5—5 of Fig. 1, looking in the direction of the arrow-heads and showing the screws and brush for breaking the circuit as often as desired during each revolution of the make-and-break disk, and

Fig. 6 is a fragmentary detail view showing one of the screws removed from the disk to permit the brush to pass over the gap left thereby and break the circuit.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, 10 designates a cylindrical shell of fiber or other non-conductor material, having removable caps 11 and 12 closing both ends. Within the shell is an electric motor 13. The motor is secured within the shell by means of a clamp 14 or other suitable means. The motor has its armature 15 mounted on a drive shaft 16, the bearings 17 and 18 of which are so spaced apart that while the motor is at rest the armature is held, at a point partially outside the area of force of the fields 19, by means of a spring 20 disposed on the drive shaft and bearing against a collar 21 thereon and against the end of the bearing 18, as shown in Fig. 1.

When the current is passed from a suitable source of supply, such as a storage battery B, through suitable supply wires 22 and 23, the fields will bring the armature completely within the area of their force, sliding the drive shaft 16 laterally through the bearings against the action of the spring. The above-described movement of the motor shaft presses a clutch disk 24, preferably formed of rubber, against a similar clutch disk 25, preferably formed of fiber, to engage the clutch members for rotating the make-and-break disk.

The make-and-break disk 26 is formed of metal and is keyed to a shaft 27. The shaft is journaled in a bearing 28, see Fig. 2, carried at the center of a circular flanged web 29 and terminates in a

worm pinion 30. The pinion meshes with the worm of a worm shaft 31 which is journaled in the shell 10 and carries a worm gear 32, see Fig. 1, which meshes with a worm 33 carried by the shaft 34 which carries the clutch member 25. The shaft 34 is journaled in a suitable bearing 35 disposed eccentrically in a circular flanged disk 36, so that the motor 14 may be conveniently located in the shell 10. The motor shaft is thus connected through the clutch members 24 and 25 and reduction gearing just described to the shaft 27 of the make-and-break disk to impart rotary movement of the motor shaft to the make-and-break disk.

The make-and-break disk is faced with an insulating disk 37, preferably formed of fiber or other desired material. By referring to Fig. 4, it will be seen that disposed on the insulating disk 37 there is disposed an annulus 38 which preferably is formed of brittle, frangible metal, the annulus being secured at intervals by lugs 39, as shown in Fig. 1, to the metal disk 26 and being thereby electrically connected to the disk 26. The metal annulus 38, as best shown in Fig. 4, is provided with concentric series of cruciform perforations 40 which produce substantially rectangular segments 41 between them, held together by small necks 42. These necks are each punched, as shown at 43, to facilitate breaking off. By breaking off a number of the segments 41 in a predetermined sequence, electrical connections will be made and broken in the same sequence as will presently appear. For the purpose of illustration, I have illustrated three concentric tracks of the segments 41.

By referring to Fig. 1, it will be seen that a series of brushes 44 are disposed on the inner face of the cap 12 of the shell and, as best shown in Fig. 3, these brushes are arcuate and are arranged at different distances from the center of the shell so as to have wiping contact with corresponding annular tracks of the make-and-break disk. These brushes are electrically connected by conductor wires 45 to corresponding alarm devices, such as horns 46, for example, the horns being connected by a common feed wire 47 to the source of electrical energy B. It will be observed that the contact brushes 44 have wiping contact with their respective concentric tracks formed by the annular series of segments 40 on the make-and-break disk 26. As the motor revolves, the make-and-break disk is rotated under the brushes. It will now be clear that the individual operator may break off at will any desired number of the segments 40 to provide tracks of predetermined pattern, including metal surfaces of predetermined length separated by intervening insulated spaces of predetermined length. Thus, by breaking off the segments in a predetermined sequence, electrical connection between each of the brushes 44 and its corresponding track will be made and broken in the same sequence as the brushes come in contact with the tracks, where segments have not been removed, and with the fiber disk 37 where the segments have been removed. Current will then pass through the brushes to the signals in the same sequence, giving the intermittent predetermined signal desired, it being understood that the metal disk 26 is grounded, of course, as will now be described.

By referring to Fig. 1, it will be seen that a grounded brush 48 is carried by the shell 10 and has wiping contact with the metal disk 26. The brush rides on an annular shoulder 49 formed on the periphery of the disk, which shoulder is of less diameter than the diameter of the remainder of the disk 26. Thus, the disk 26 is grounded so that a circuit may be traced, as shown diagrammatically in Fig. 1, from the source of supply B, feed wire 47, alarm device 46, wire 45, brush 44, metal annulus 38, lugs 39, disk 26, brush 48, to the ground.

In order to independently make and break the circuit just traced, a plurality of screws 50 are threaded through the face of the disk 26 in an annular series concentric and parallel with the axis of the disk shaft 27. The centers of the screws coincide with the circumference of the annular shoulder 49 of the disk. After the screws are inserted, they are machined to make the periphery of the shoulder 49 a smooth continuous surface. It is now clear that the brush 48 has wiping contact with the shoulder 49 and screws 43 so long as the screws are in position, but if one or more of the screws is removed, the brush will pass a gap at the point of removal of the screw, as best shown in Fig. 6, and the circuit will be broken at the gap. Obviously, the circuit will be broken only once by removing one screw, and, if there should be a total of four screws, it will be broken twice in a complete revolution by removing two opposite screws, or will be broken four times by removing all four screws. This will permit of arranging a signal of full length duration, half length, or quarter length duration, respectively, at the will of the individual.

In operation, the switch 51, conveniently placed, for instance, on the steering wheel of an automobile, has one pole connected to a binding post 52 and the other grounded on the chassis of the car. One pole of the battery B is likewise grounded, and the other pole is connected, as above stated, by the wire 22 to a binding post 53 which, together with the binding post 52, is connected in the field of the motor by corresponding feed wires 54 and 55.

At the position of rest, the circuit at 51 is broken. The ground at the brush 48 is opened as the brush finds itself in one of the holes 56 from which a screw 50 has been removed, so that all electrical connection between the ground and the mechanism is broken. When the circuit is closed at 51, current passes from the battery B through the binding post 53 to the motor 13 and back to the ground through the binding post 52 which sets the motor in motion. This rotates the disk 26 and the ground is maintained through the brush 48 after contact is broken at 51.

Current will continue to flow until the brush 48 falls into the next hole on the disk 26 as the latter rotates. In the meantime, the metal annulus 38 is rotated under the brushes 44, and contact is made and broken between the ground and one terminal of the signals 46 as the brushes come in contact with the metal segments 41 of the annulus, as above described. As above noted, the other terminals of the signals are directly connected through the wire 47 to the battery B. Immediately the circuit has been broken by the brush 48 falling into one of the holes 56 on the disk 26, the armature shaft 16 is retracted and disengages the clutch member 24 from the clutch member 25, due to action of the spring 20, as above described, and the momentum of the armature is permitted to expend itself at leisure while the clutch member 25 will almost immediately come to rest through the friction of the reduction gearing and before the make-and-break disk can move sufficiently far to make contact again through the brush 48.

From the above description it is believed that the construction and operation of my invention will be fully understood without further explanation.

Having thus described the invention, I claim:

1. An electric signaling device comprising a metal rotary disk, a brittle metal annulus on the face of the disk having cruciform perforations providing frangible arcuate concentric contact segments which may be torn from the disk to produce a predetermined pattern of substantially oblong metal segments, a disk of insulating material between the rotary disk and the annulus, a brush having a wiping engagement with said annulus and with the gaps in the insulating disk left by torn out segments, and screws electrically connecting the annulus with the metal disk and removably securing the annulus to the metal disk.

2. An electric signaling device comprising a metal rotary disk, a brush for grounding the disk, an annulus of brittle frangible metal carried on the face of the disk, a disk of insulating material between the annulus and the rotary disk, screws passed through the annulus and into the rotary disk for electrically connecting the disk with the annulus, said annulus having a plurality of annular series of cruciform concentric perforations adapted to produce frangible concentric substantially oblong segments which may be torn from the annulus to provide a predetermined pattern of concentric segments and gaps of insulating material, and a brush having wiping contact with the annulus and with the gaps of insulation between the segments thereof.

3. An electric signaling device comprising a rotary grounded metal disk, an annulus of brittle metal insulated from the face of the disk, means electrically connecting the annulus with the disk, said annulus being provided with a plurality of concentric annular series of cruciform perforations to provide concentric rectangular segments connected together by small necks, said necks being perforated to permit of certain of the segments being torn from the annulus to produce a predetermined pattern of the remaining segments, and brushes forming terminals of an electric circuit having wiping contact with said annulus.

4. An electric signaling device comprising a rotary metal disk, a frangible disk of brittle metal on the rotary disk insulated from the rotary disk and perforated to produce a predetermined pattern of concentric annular tracks of substantially oblong contact segments, the segments being adapted to be readily torn apart to produce a predetermined pattern for providing a desired sequence of closing an electric circuit, brushes bearing on said tracks, and means for electrically connecting said tracks and said rotary disk.

5. An electric signaling device comprising a motor-rotated disk, a plurality of brushes, and an annular series of concentric metal tracks on the face of the disk passing under corresponding brushes during rotation of the disk, the tracks having frangible segments adapted to be torn out to provide a predetermined pattern of the remaining segments to permit current to flow in a corresponding series of intervals as the tracks are rotated under the brushes by the motor.

6. An electric signaling device comprising a metal motor-rotated disk, a disk facing of frangible brittle metal thereon and insulated therefrom, said facing being electrically connected to said disk, said facing being perforated having substantially cruciform perforations arranged in concentric annular series to produce concentric annular tracks composed of segments which may be ripped from each other to produce a predetermined pattern for providing a desired sequence of closing an electric circuit, and brushes forming circuit terminals having wiping engagement with said tracks.

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